morrison

DINOSAURS!

•DISCOVER THE GIANT PREHISTORIC WORLD•

42

UK £1.50
Republic of Ireland IR£1.50
Australia $3.75; Malta 75c
New Zealand $4.75 inc. GST
South Africa R6.75 inc. VAT
R6.14 (excl. Tax – other countries)
Singapore $4.50; Malaysia $5.50

SOR

ORBIS
DE AGOSTINI
GROUP

AN ORBIS PLAY & LEARN COLLECTION

DINOSAURS!

• DISCOVER THE GIANTS OF THE PREHISTORIC WORLD •

IDENTIKIT

Your guide to three more beasts from the Age of the Dinosaurs

GASOSAURUS 985

BRACHYLOPHOSAURUS 988

SEISMOSAURUS 989

DINOSAUR WORLD

Get out your wet suit and dive into the UNDERSEA WORLD 990

SPOTTER'S GUIDE

Find out about cheeks in CHEEK TO CHEEK 998

TIME DETECTIVE

In order to survive, dinos had to be experts in DEFENCE 1000

HISTORY IN PICTURES

The story behind THE BEAST OF THE BADLANDS 1004

A to Z

From *Saurornitholestes* through to *Segnosaurus* 1008

ASK THE EXPERT

Dr David Norman of Cambridge University answers more of your dinosaur queries BACK COVER

PLUS

GIANTS OF THE PAST

Powerful *Gasosaurus* take their victim by surprise 994

3-D Gallery

Carnotaurus and *Chubutisaurus* battle it out in 3-D 996

DINO Fact File

Test your knowledge and learn some more facts 1006

HOW TO CONTINUE YOUR COLLECTION

Most people collect their issues by placing a regular order with their newsagent. You can, however, also obtain your copies directly in the following ways:

UK and REPUBLIC OF IRELAND

Subscriptions:
Phone 0424 755755 for information (Mon-Fri, 9am-5pm).

Back issues:
If you miss any issues of DINOSAURS!, these can be ordered through your newsagent. Alternatively, you can order back issues by phoning 0424 755755 (Mon-Fri, 9am-5pm). Credit card orders accepted. Or write to:
Back Issues Department, DINOSAURS!,
PO Box 1, Hastings, TN35 4TJ.
Back issue charges: Issue 1: 30p. All other issues: £1.50. Postage and packing: 50p per copy. When ordering, please enclose:
1. Your name, address and postcode.
2. The issue number(s) and number of copies of each issue you require.
3. Your payment. This can be by postal order or cheque made payable to Orbis Publishing Ltd. You can calculate the amount based on the charges shown above.

Binders:

UK

DINOSAURS! binders are now available. Each binder holds 13 issues and costs just £4.95 (including £1 p&p).
You can order binders direct from:
DINOSAURS!, PO Box 1, Hastings, TN35 4TJ.
Please enclose payment for £4.95 for each binder. You can pay by cheque or postal order made payable to Orbis Publishing Limited, or phone 0424 755755. Telephone credit card orders are accepted.

Republic of Ireland

Binders are available through your newsagent, priced at £4.95.

AUSTRALIA

Back issues: Write to:
Gordon & Gotch Ltd, P.O. Box 290, Burwood, Victoria 3125. Please enclose your payment of the cover price plus $1 per issue p&h.
Binders: Details will be published in future issues. Or you can write to: DINOSAURS! Binders, Bissett Magazine Service Pty Ltd, MC Box 460, Eastern Mail Centre, Victoria 33110.

NEW ZEALAND

Back issues: Write for details to: Gordon & Gotch Ltd, P.O. Box 584, Auckland.
Binders: Details will be published in future issues. Or you can write for details to the address above.

MALTA

Back issues: These can be ordered through your newsagent.
Binders: Write for details to:
Miller (Malta) Ltd, Valetta.

SOUTH AFRICA

Back issues: Telephone 011 402 3816 for details. Or write to: Back Issues Department, Republican News Agency, PO Box 16034, Doornfontein, 2028. Please enclose your payment of the cover price plus 2 Rand per issue p&h.
Binders: These can be obtained at the shop where you bought this magazine.

SINGAPORE, MALAYSIA

Back issues and binders:
These can be obtained at the shop where you bought this magazine.

DINOSAURS! is published by
Orbis Publishing Ltd
Griffin House
161 Hammersmith Rd
London W6 8SD

© 1994 Orbis Publishing

N42 94 01 20

Printed in Italy by Officine Grafiche De Agostini, Novara

GASOSAURUS

***Gasosaurus* was a terrifying hunter about the height of a polar bear.**

Striding around on its two powerful legs, *Gasosaurus* scanned the lush Jurassic landscape for its next meal. The medium-sized predator probably fed on young, unprotected dinosaurs. With its mouth gaping wide, it surprised them in a sudden ambush. Even large plant-eaters were not safe, especially if they were sick or old. *Gasosaurus* had a carnivore's instinct for searching out the weakest prey.

HUGE HEAD

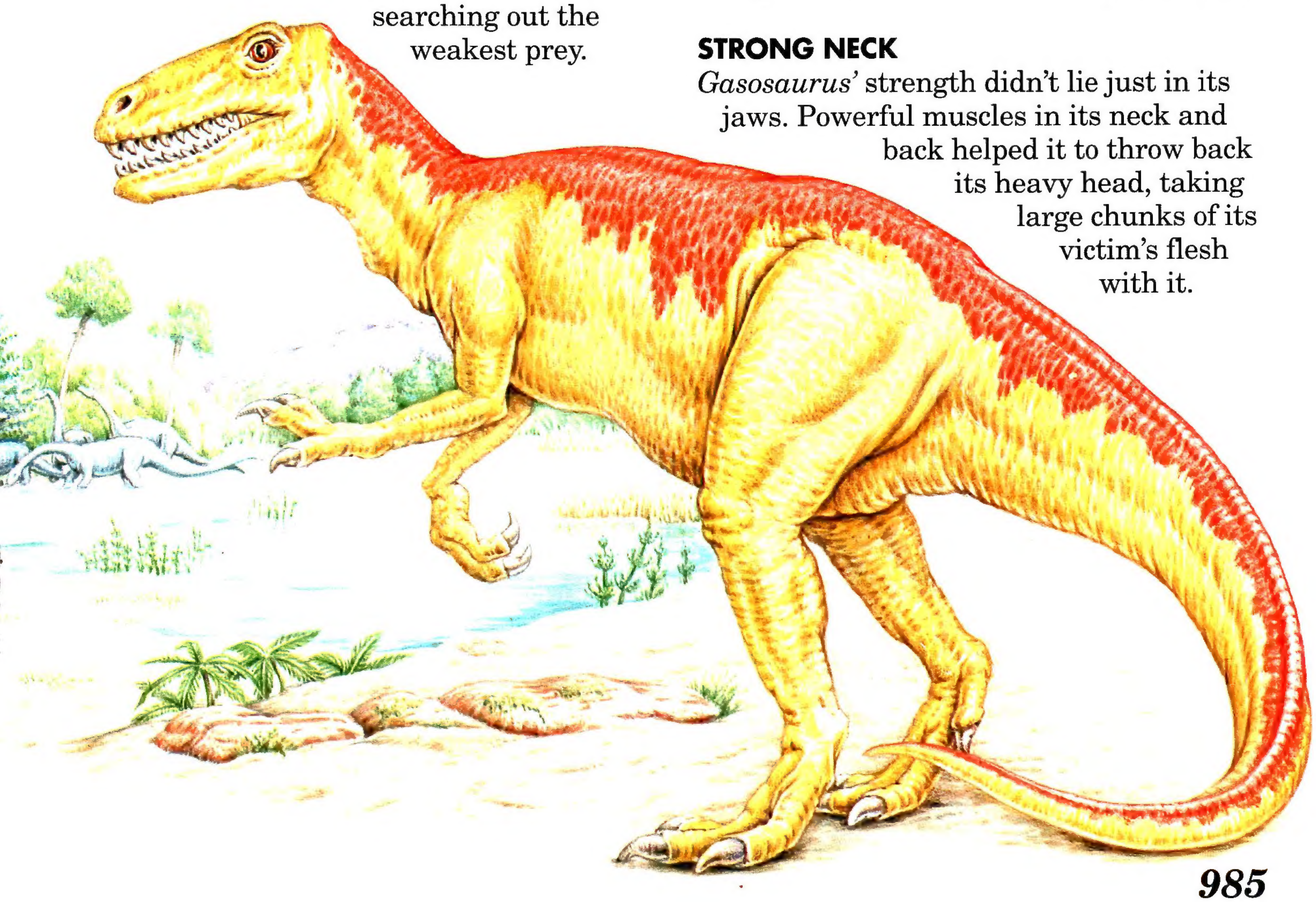
Big-headed carnosaurs looked strangely top-heavy. But the size and strength of their skulls and jaws were the key to their success as predators.

VICE-LIKE GRIP

When *Gasosaurus* closed its jaws on its prey, its curved, dagger-like teeth sank into the flesh. As the terrified victim tried to break away, the hunter's jaws gripped like a vice. Struggling only made matters worse because then the predator's teeth tore great chunks from the body of its prey.

STRONG NECK

Gasosaurus' strength didn't lie just in its jaws. Powerful muscles in its neck and back helped it to throw back its heavy head, taking large chunks of its victim's flesh with it.



PLANT-EATERS' ENEMY

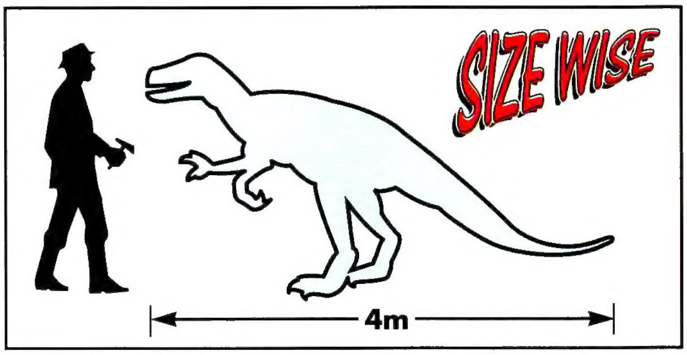
Plant-eaters such as *Datousaurus* and *Shunosaurus*, that lived in China at about the same time as *Gasosaurus*, had to keep their eyes open for the stealthy approach of this fierce enemy.

KILLER CLAWS

Like other carnosaurs, *Gasosaurus* had slender fingers. Each of the fingers was tipped with long, sharp claws. These claws provided the dinosaur with a useful tool for its stubby arms.

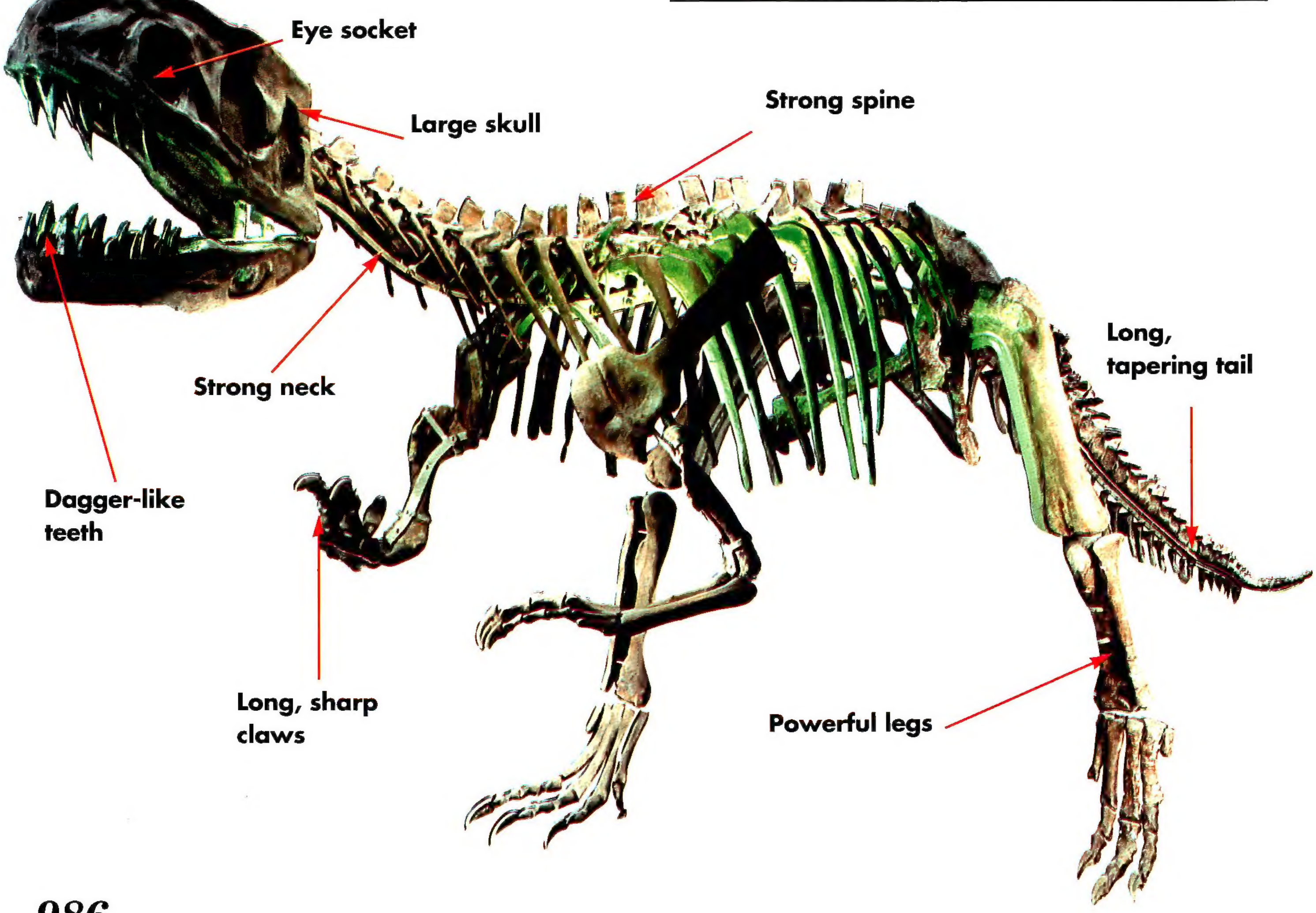
HANDY WEAPON

When it attacked live prey, *Gasosaurus* slashed the skin until the victim was too weak to resist. To tackle larger prey, *Gasosaurus* probably hunted in groups.

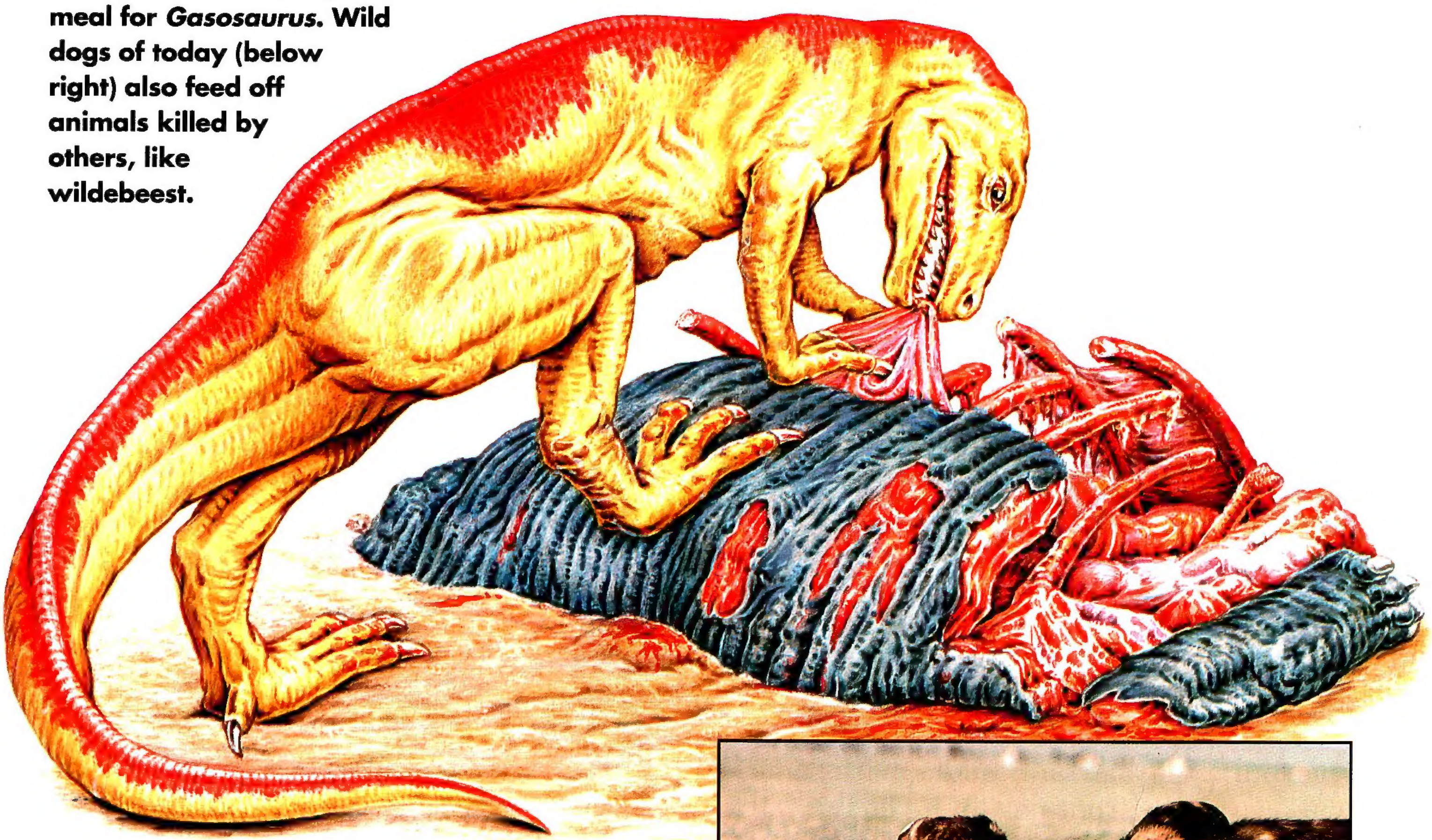


MONSTER FACTS

- **NAME:** *Gasosaurus* (gas-oh-saw-rus) means 'gas reptile' because the petroleum industry contributed to its excavation
- **SIZE:** 4m long and 2.5m high
- **FOOD:** meat
- **LIVED:** about 170 million years ago in the Mid Jurassic Period in Sichuan Province, China



A carcass was a ready-made meal for *Gasosaurus*. Wild dogs of today (below right) also feed off animals killed by others, like wildebeest.



SCAVENGER TOO

Animals killed by other dinosaurs and those that died naturally through old age also made a tasty meal for *Gasosaurus*. Once again, the scavenger's sharp finger claws easily tore the flesh away from the lifeless creature's bones.

BODY TALK

The huge, powerful legs of *Gasosaurus* were much longer than its short arms. Its head and shoulders were held low and the rest of its body sloped forward.

FINE TUNING

Behind it, *Gasosaurus* held out its long, tapering tail to counterbalance the weight of its body. As finely balanced as an athlete, the dinosaur could sprint in short bursts without toppling over.

Is it true that the first recorded dinosaur fossils were found in China?

Yes. But the finder did not know they belonged to a dinosaur. The fossils were described in a book written over 1,700 years ago by the Chinese scholar Chang Qu. He wrote about the discovery of dragon bones in Sichuan Province. Experts now know the fossils belonged to a dinosaur.

BRACHYLOPHOSAURUS

***Brachylophosaurus* was no pushover when it fought head to head.**

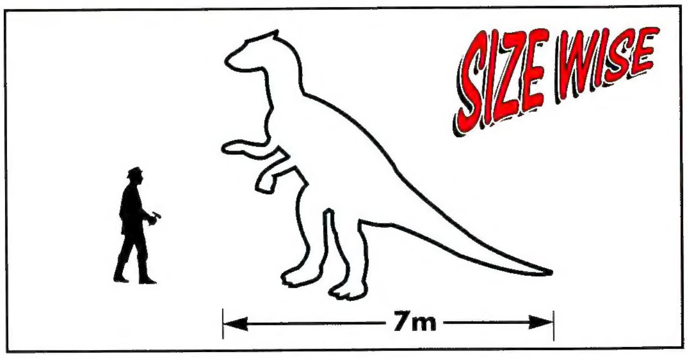
Some experts think that rival males in *Brachylophosaurus* herds took part in trials of strength. They head-butted each other and the winner took control of the herd. Like a dome-headed dinosaur, *Brachylophosaurus* had a thick skull protecting its brain, so little damage was done. A shield of bone ran from its snout to the top of its flat head, ending in a short spike.

DUCKBILLED DINOSAUR

A complete skull of *Brachylophosaurus* was found in Alberta, Canada, with some bones from the front part of its body. As long as an elephant, this duckbilled dinosaur walked on two or four legs.

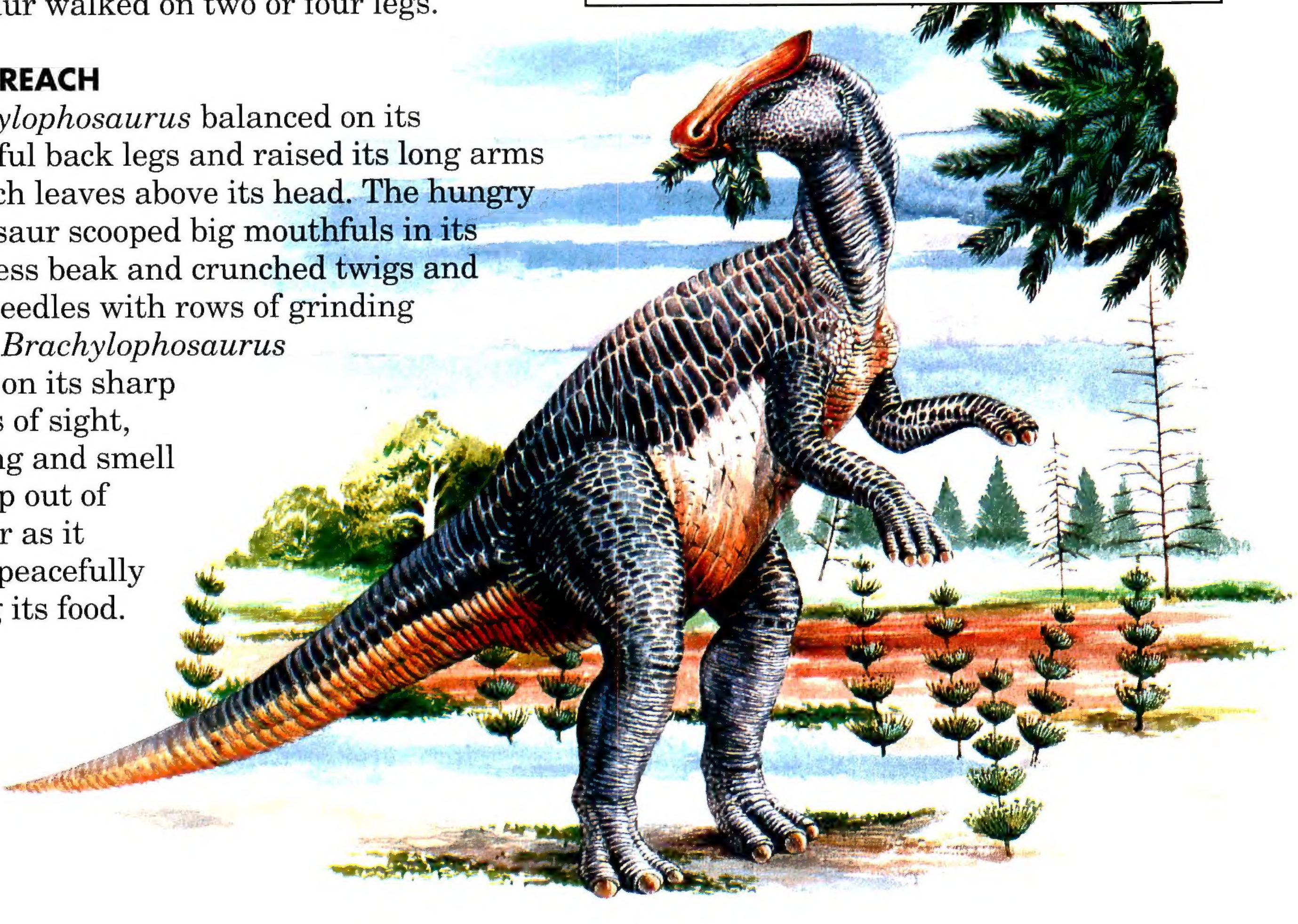
HIGH REACH

Brachylophosaurus balanced on its powerful back legs and raised its long arms to reach leaves above its head. The hungry hadrosaur scooped big mouthfuls in its toothless beak and crunched twigs and pine needles with rows of grinding teeth. *Brachylophosaurus* relied on its sharp senses of sight, hearing and smell to keep out of danger as it stood peacefully eating its food.



MONSTER FACTS

- **NAME:** *Brachylophosaurus* (brack-ee-loaf-oh-saw-rus) means 'short-crested reptile'
- **SIZE:** about 7m long
- **FOOD:** plants
- **LIVED:** about 75 million years ago in the Late Cretaceous Period in Alberta, Canada and Montana, USA



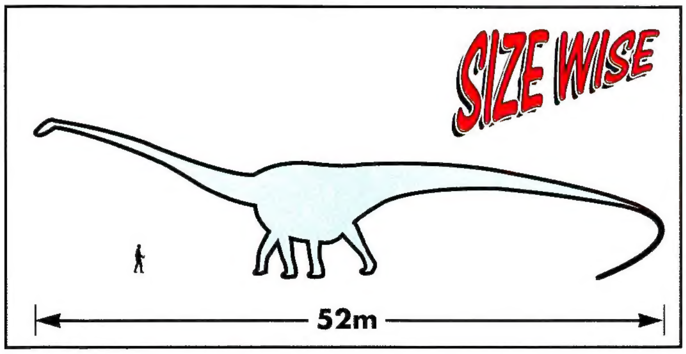
SEISMOSAURUS

Gigantic *Seismosaurus* was longer than a blue whale.

Although about the same height as *Diplodocus*, *Seismosaurus* was twice as long! In 1979 some enormous bones were found in New Mexico, USA. Six years later, they were identified as the bones of a new sauropod.

EARTH-SHAKER

Experts were amazed when they estimated the dinosaur's length. Record-breaking *Seismosaurus* was probably as long as 26 adult humans lying head to toe. They named the new find 'earth-shaker reptile'.



MONSTER FACTS

- **NAME:** *Seismosaurus* (size-moh-saw-rus) means 'earth-shaker reptile'
- **SIZE:** up to 52m long
- **FOOD:** plants
- **LIVED:** about 120 million years ago in the Early Cretaceous Period in New Mexico, USA

ALL NECK AND TAIL

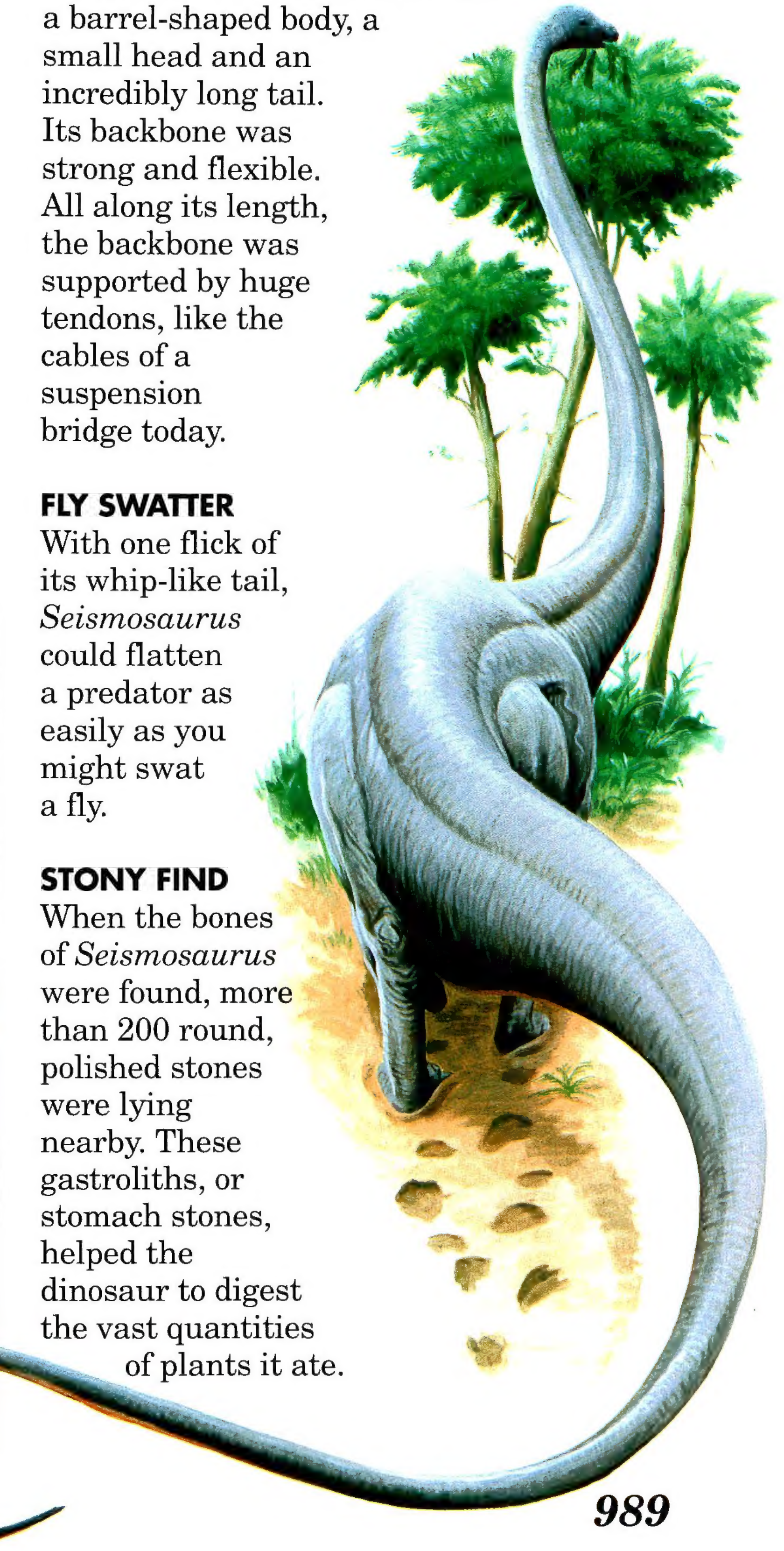
Long-necked *Seismosaurus* had a barrel-shaped body, a small head and an incredibly long tail. Its backbone was strong and flexible. All along its length, the backbone was supported by huge tendons, like the cables of a suspension bridge today.

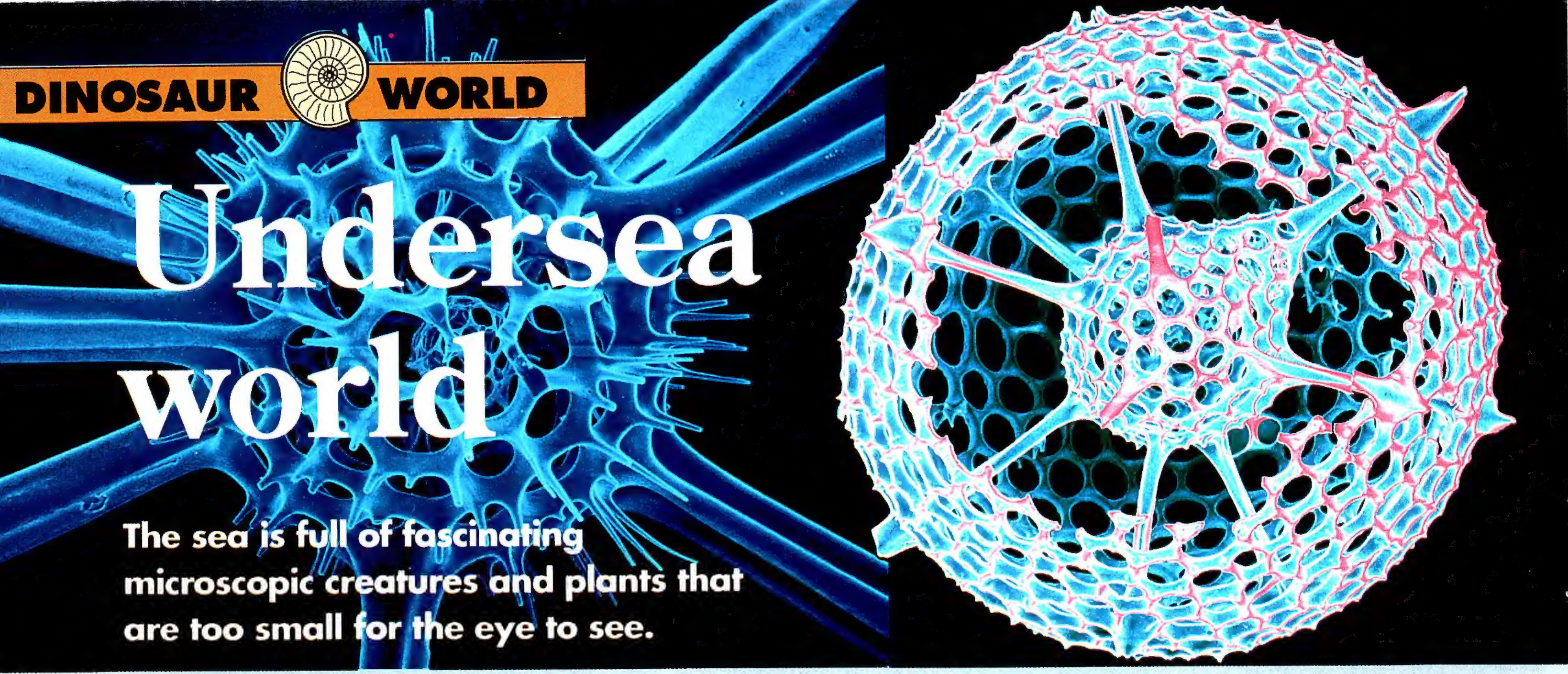
FLY SWATTER

With one flick of its whip-like tail, *Seismosaurus* could flatten a predator as easily as you might swat a fly.

STONY FIND

When the bones of *Seismosaurus* were found, more than 200 round, polished stones were lying nearby. These gastroliths, or stomach stones, helped the dinosaur to digest the vast quantities of plants it ate.





Undersea world

The sea is full of fascinating microscopic creatures and plants that are too small for the eye to see.

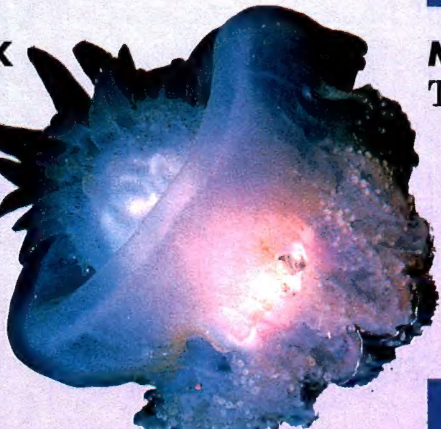
When you swim in the sea, you may see fish, and perhaps a crab or a prawn. But you can't see the sea's most numerous animals, because they are too small. These miniature creatures are the basis of ocean life. All the bigger sea creatures – from fish to octopuses, seals, sharks and huge whales – depend on them.

NO BACKBONES

Ocean animals without backbones are called invertebrates. They range from tiny plankton to pea-sized corals and whirly-shelled ammonoids the size of a table. Some sea invertebrates, like jellyfish, have no hard body parts. So their fossils are rare. But some make shells, spines or stony cups for support and protection. These form excellent fossils.

GOING WAY BACK

Many sea animals alive today had similar cousins during the Age of the Dinosaurs. Some are even older than the dinosaurs. A few go back more than 1,000 million years.



ROCKY CLOSE-UP

Even the tiniest scraps of life, made up of only one cell, form fossils. At first sight, rocks such as chalk and limestone may not appear to contain many fossils. But they look very different through a microscope.

The white cliffs of Dover (above) are full of microfossils that tell us about the past.

MICROFOSSILS

The rocks are packed with the shells of tiny creatures that floated in the seas when alive, and fell to the bottom when dead. These microfossils are very important to dinosaur experts. Scientists can tell by looking at them how old rocks are.

The jellyfish (left) is a modern invertebrate that has no hard body parts.

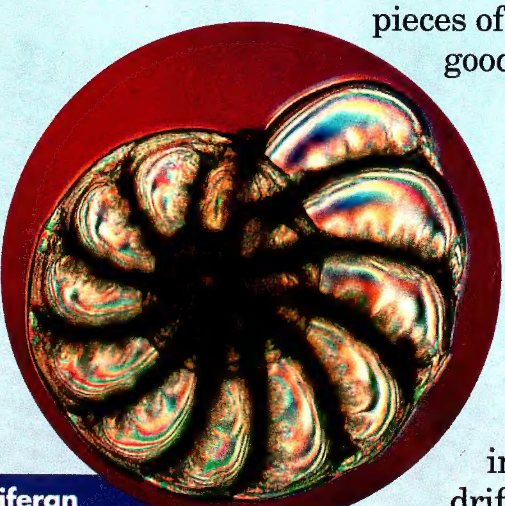
The beautiful circular patterns of two radiolarian skeletons seen through a microscope (left and far left).

CHALK-MAKERS

The white cliffs of England's coasts are made largely from coccoliths. Each had only one cell, and made a patterned shell which turned into chalk. They swarmed in the Jurassic and Cretaceous, died in their billions, and formed huge layers of rocks. Coccoliths are still alive today.

TINY BEAUTIES

Foraminiferans also have only one cell, but they can be several centimetres long. A 'foram' makes itself a delicate shell, and adds new sections as it grows. It waves jelly-like arms through holes in the shell, to catch micro-food.



The whirly shape of a foraminiferan today (right), magnified many times.

THE SEA'S SNOWFLAKES

Radiolarians are also one-celled life-forms, related to forams, that still live in the ocean plankton today. Their glassy skeletons have beautiful circular patterns, like stars or snowflakes.

ANIMAL BAGS

Sponges may not look like animals, but they are – just about. Each sponge sucks in water through tiny holes in its body, and squirts it out through one big hole. Inside the body, micro-hairs catch tiny floating food particles. A sponge's body is strengthened by minute spikes and pieces of limestone. These make good fossils.

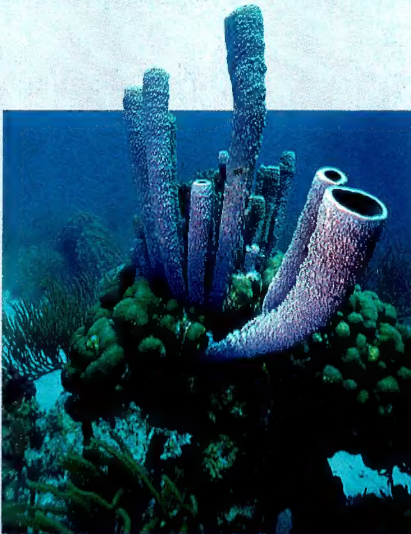
STONY CUPS

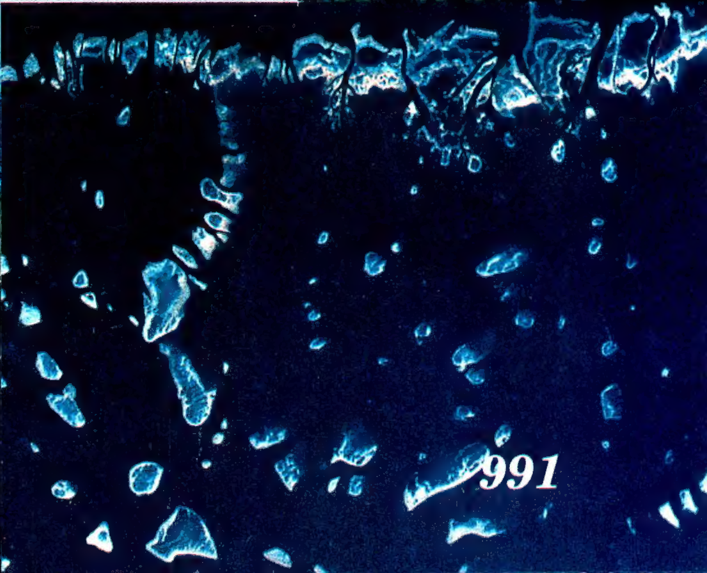
Coral consists of tiny animals, like miniature sea anemones, called polyps. Each polyp makes a stony cup to hide in during the day. At night it stretches its tentacles in the water to catch drifting food particles.

REEF BUILDERS

When polyps die, their stony cups remain. More polyps make more cups on top. Over thousands of years, layers of cups become huge reefs. By day the coral rock looks bare. At night it glistens like a colourful living carpet, as the polyps wave their tiny tentacles.

A coral reef today (below). The Great Barrier Reef off the coast of Australia (below right) is so big it can be seen from space. Sponges grow on coral at the bottom of the sea (far right).





MUSCULAR MOLLUSCS

Molluscs include snails and slugs on land, and limpets and whelks on the seashore. Oysters, mussels, cockles and clams are called bivalve molluscs. Each has two hinged half-shells, or valves, held together by strong muscles. The animal pokes out tubes or siphons from between the valves, to suck in water for filter-feeding. Most molluscs also have a fleshy, finger-like foot for moving along or digging into sand.

TERRIFYING TENTACLES

Another big group of molluscs are the cephalopods, or 'head-foots'. Today they include octopuses, squid and cuttlefish. These wide-eyed, alert, clever animals catch prey with their long tentacles and rip it apart with their beak-like mouths.

NAUTILOIDS

The early cephalopods appeared long before the dinosaurs. These were nautiloids. At first they had straight shells, divided into sections. The shells gradually evolved until they were coiled in a spiral. Today there is only one survivor of the group, the pearly nautilus.

A banded coral shrimp eating a smaller shrimp.

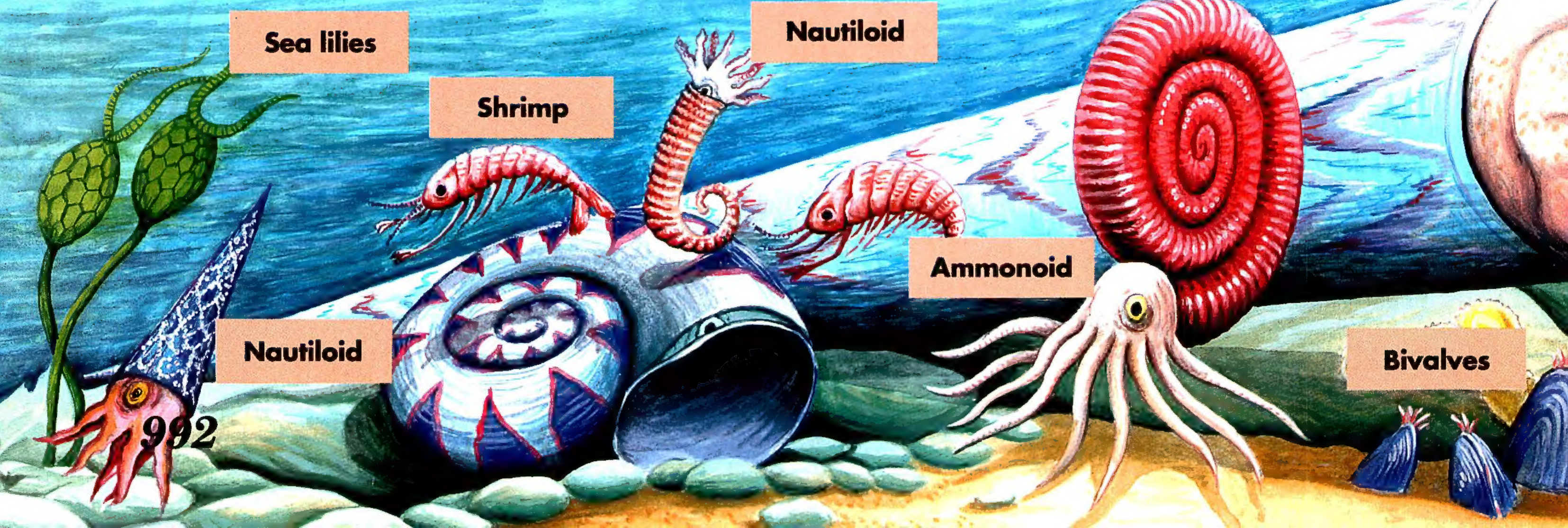
AMMONOIDS

Ammonoids were very successful in the Age of the Dinosaurs. Some grew to huge sizes, as large as 3m across. Most had spiral-coiled shells, but some began to evolve straight ones. They all died out. Yet in places such as Dorset, the rocky beach is covered with fossil ammonoids.

The octopus (below left) swims through the deep oceans today looking for prey to grab with its strong tentacles.

BELEMNITES

Belemnites were another group of fierce hunting cephalopods. They were very common during the Age of the Dinosaurs but have now died out. A belemnite had a shell inside its body. The shell was often pencil-shaped or bullet-shaped, and the fossils are called 'belemnite bullets'. Belemnites were probably relatives of today's cephalopods.



Is it true that many sea creatures eat sludge and ooze?

Yes. The smelly mud around estuaries and mudflats may not seem tasty to us. But it is delicious food for worms and shellfish by the million. They eat the mud, digest the tiny particles of food mixed in it, and expel clean mud at the other end – just as earthworms do in soil.

TRULY LIVING FOSSILS

Lampshells live on the sea bed, filtering food from the water. They look like oysters or mussels, but are in a different group of their own, called the brachiopods. They have been around, almost unchanged, since well before the dinosaurs.

SWARMING SEAS

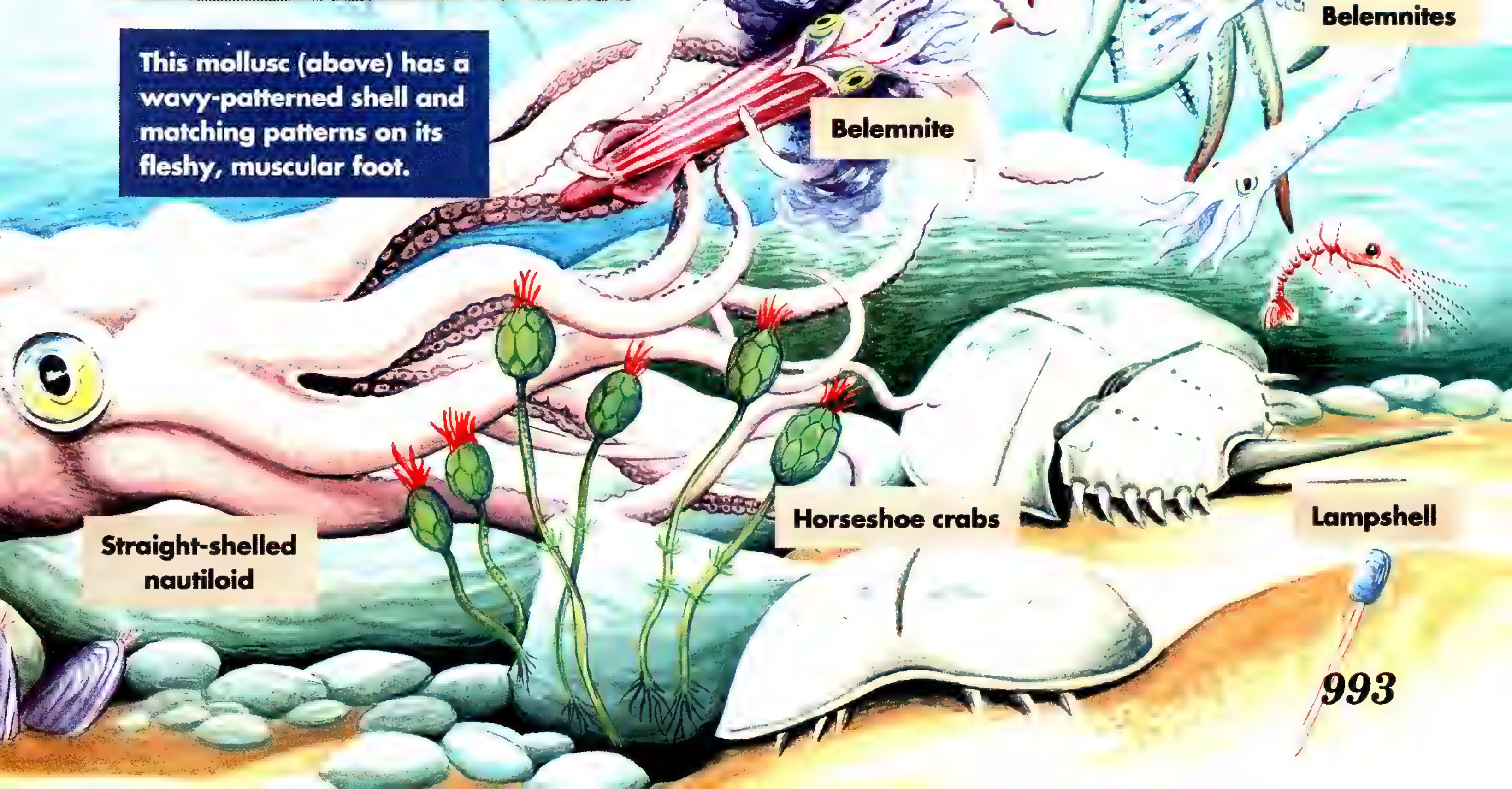
Other invertebrate creatures that lived at the same time as the dinosaurs were starfish, sea urchins and sea lilies. Barnacles, crabs, lobsters, shrimps and prawns also lived then.

STROLL BACK IN TIME

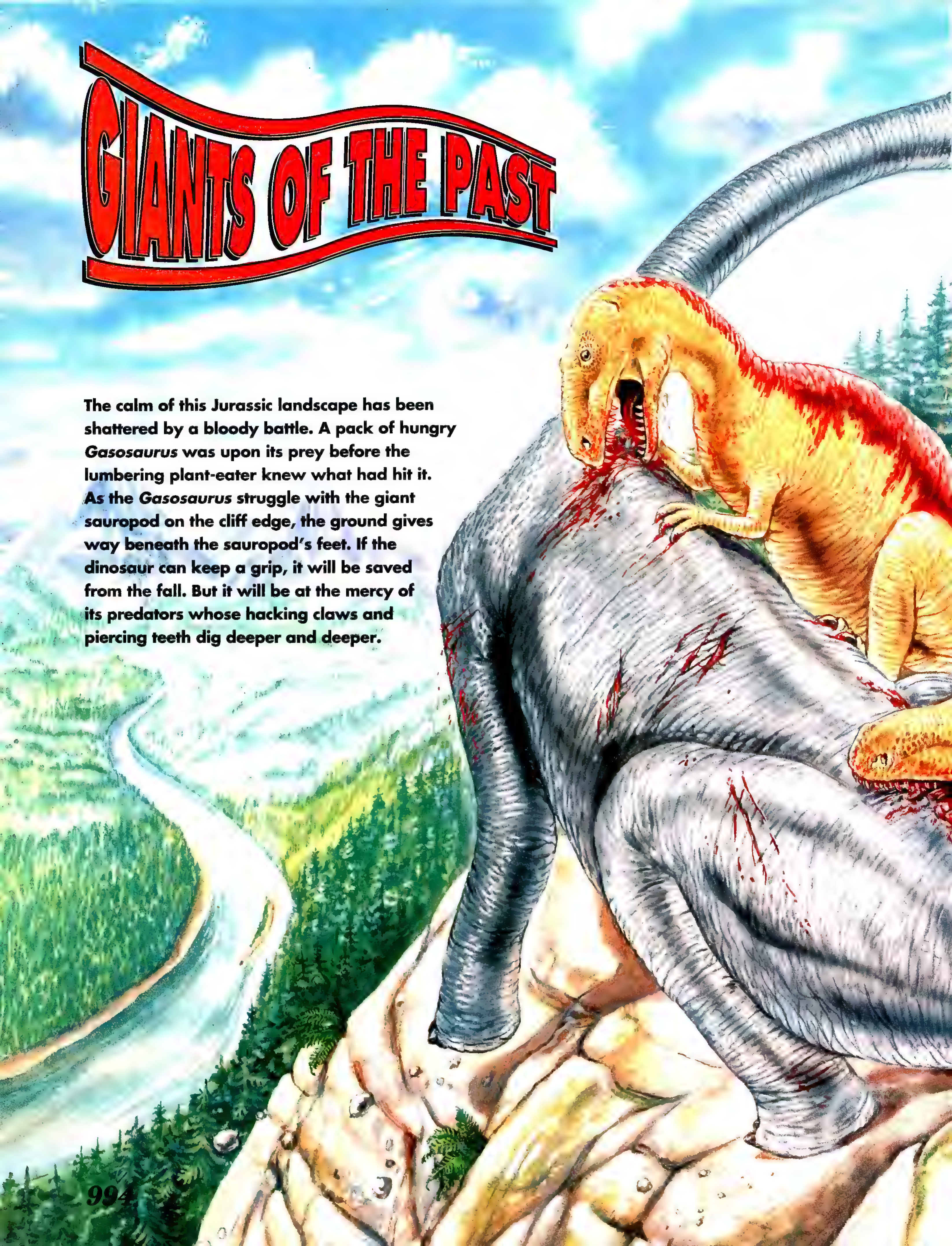
Next time you wander along the coast and look at the seashells and shore animals, remember that very similar creatures were alive when dinosaurs were walking beside the sea.

This mollusc (above) has a wavy-patterned shell and matching patterns on its fleshy, muscular foot.

An underwater scene from the Age of the Dinosaurs (below). The relatives of many of these creatures live at the bottom of the oceans today.



GIANTS OF THE PAST

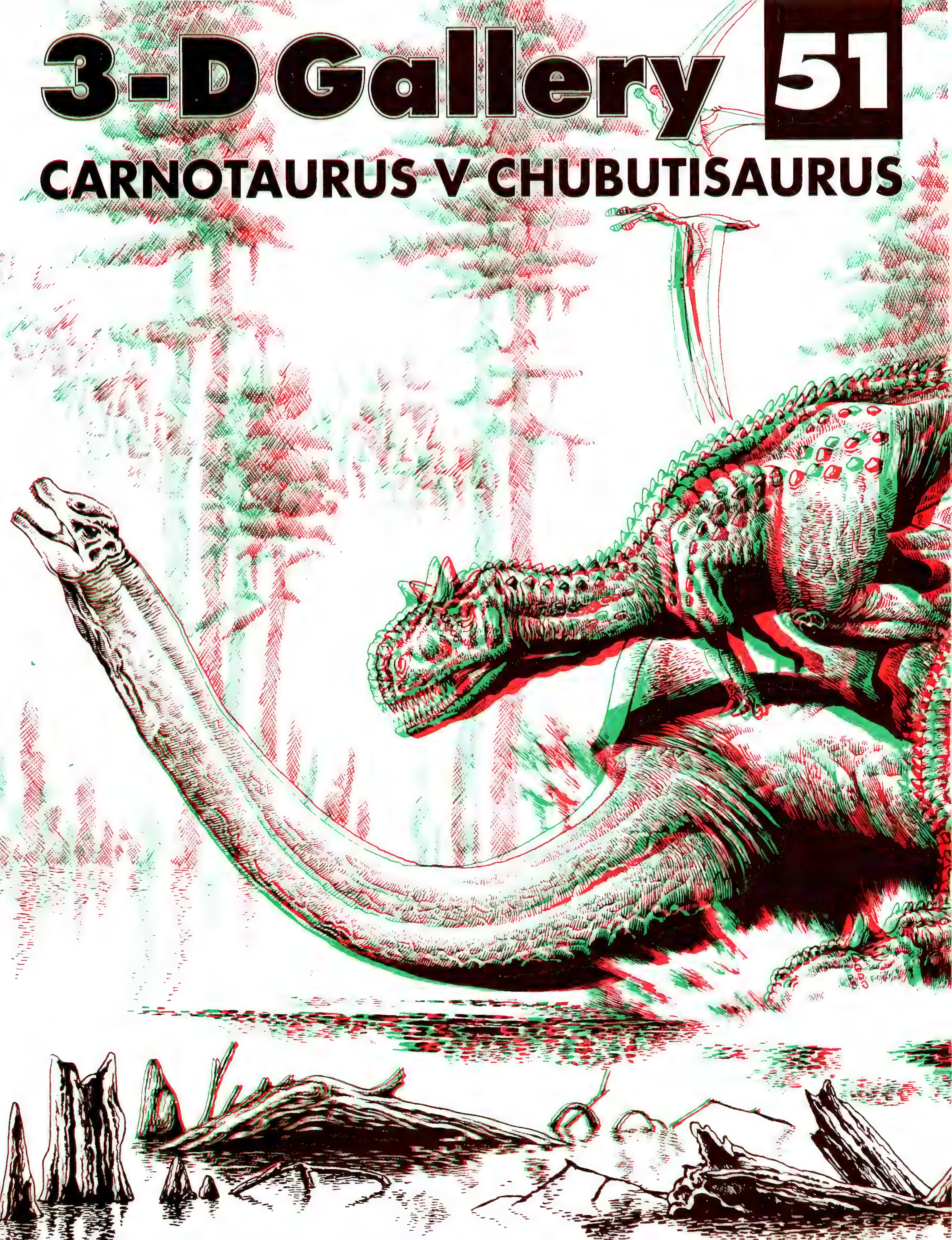


The calm of this Jurassic landscape has been shattered by a bloody battle. A pack of hungry *Gasosaurus* was upon its prey before the lumbering plant-eater knew what had hit it. As the *Gasosaurus* struggle with the giant sauropod on the cliff edge, the ground gives way beneath the sauropod's feet. If the dinosaur can keep a grip, it will be saved from the fall. But it will be at the mercy of its predators whose hacking claws and piercing teeth dig deeper and deeper.

GASOSAURUS

3-D Gallery 51

CARNOTAURUS V CHUBUTISAURUS



Two *Carnotaurus* jump a *Chubutisaurus* as it plods through a Cretaceous forest in South America. The huge plant-eater crashes to the ground. One of its predators falls too and is knocked unconscious. But another killer is ready to join in.

Cheek to cheek

Humans, hamsters and hadrosaurs all have cheeks. What are cheeks for, and do all animals have them?

Cheeks are there to stop the food falling out of your mouth when you eat. Imagine trying to eat food full of bits, such as cereal, without cheeks to keep it in your mouth.

STRINGY PLANTS

Plants are stringy and have to be ground up before they can be swallowed. So most plant-eaters have special teeth for chewing and cheeks to keep food from falling out of their mouths.

DINOS WITH CHEEKS

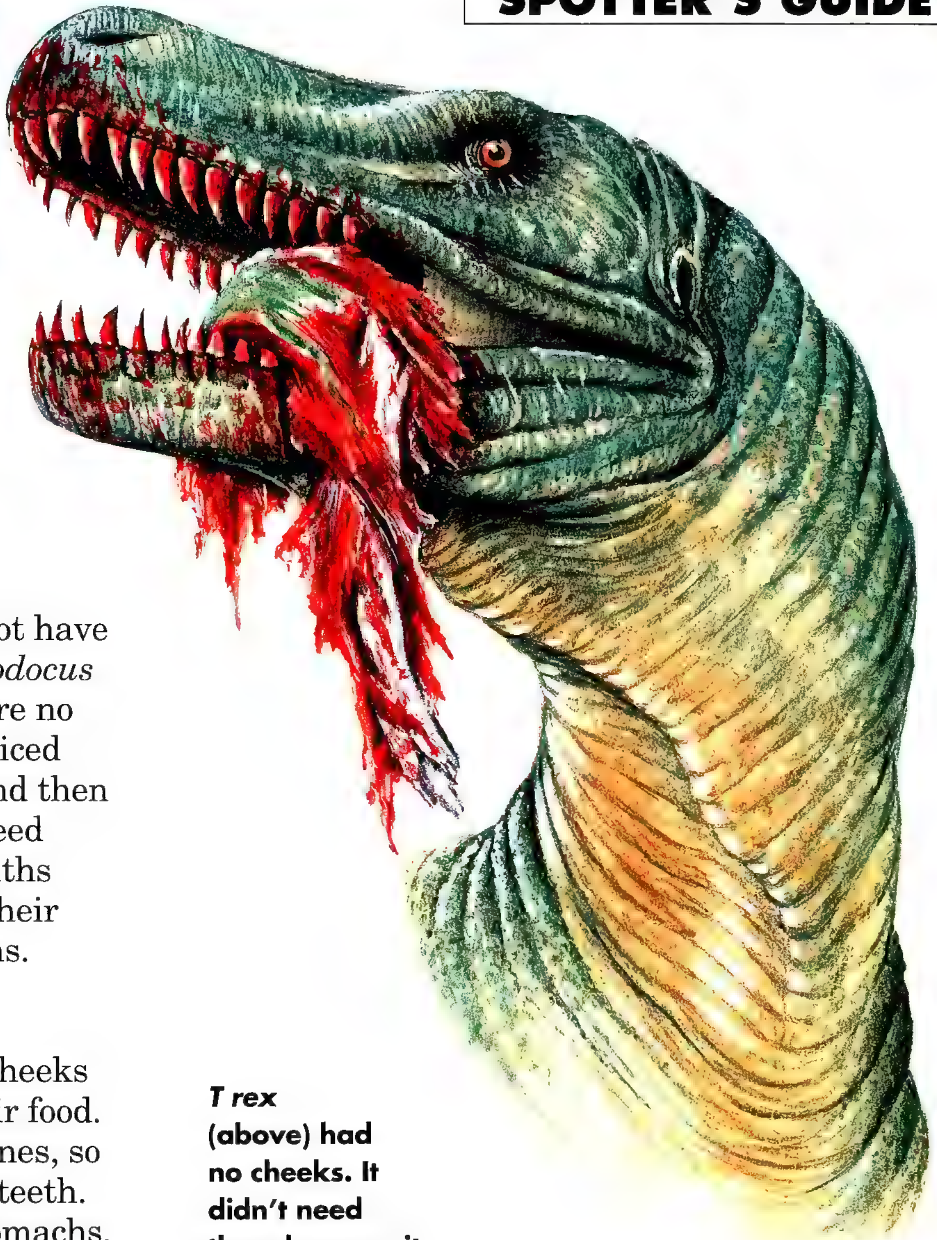
From looking at the skulls and teeth of dinosaurs, scientists have been able to work out which of them had cheeks and which didn't have them. The skulls of plant-eating ceratopians like *Triceratops* and ornithopods like *Iguanodon* show that they had powerful jaw muscles to work their batteries of teeth. Scientists think that these types of dinosaurs had cheeks to keep their food in their mouths.

NO CHEEKS

Not all dinosaurs had cheeks though. Meat-eating theropods such as *T rex* and *Allosaurus* had sharp, piercing teeth with saw-like edges. Their teeth were made for tearing up meat, not chewing and grinding plants. They bolted their food down without chewing it, so they didn't need cheeks.

Cretaceous plant-eater *Anatotitan* (left) had cheeks to hold plants in its mouth as it chewed them. Today, the Arctic ground squirrel from Alaska (below) has very large cheek pouches for storing food.

The collared lizard (above) is a modern, insect-eating reptile without cheeks.



STOMACH STONES

Some plant-eating dinosaurs did not have cheeks either. Sauropods like *Diplodocus* had weak, peg-like teeth which were no good for chewing. These animals sliced up plants with their feeble teeth and then gulped them down. They did not need to chew the plants because gastroliths (stomach stones) helped grind up their food when it reached their stomachs.

LONG SMILE

Some modern animals don't need cheeks either because they don't chew their food. Like *Diplodocus,* birds swallow stones, so they don't need cheeks or chewing teeth. Their food is ground up in their stomachs. Crocodiles don't have cheeks either. They have long, grinning mouths, with sharp, stabbing teeth. Like *T rex*, they swallow chunks of food without chewing.

T rex **(above) had no cheeks. It didn't need them because it swallowed chunks of meat whole. Today's crocodile (below) does the same thing.**

HANDY CHEEKS

Plant-eating dinosaurs would have found their cheeks very useful. Imagine yourself chewing some tasty shoots. Suddenly *T rex* appears. What do you do? Run, of course. But first you'd stuff your food into your cheeks, so as not to lose it. If you were a small, meat-eater like *Deinonychus*, with no cheeks, you'd probably have to leave your meal to *T rex*.

Defence

Most dinosaurs were peaceful plant-eaters. But they all had to protect themselves from hungry meat-eaters.

Each group of dinosaurs had some way of defending itself if attacked. Many of the larger plant-eaters protected themselves by travelling in herds. Smaller dinosaurs used their speediness and ran away. Some plant-eaters were just too big to be attacked. Other dinosaurs hid behind their own body armour.

GENTLE GIANT

One of the tallest dinosaurs was *Brachiosaurus*. If it stretched its neck upwards it could have looked over the top of a three-storey building. *Brachiosaurus* was a peaceful, plant-eating sauropod which browsed on the tree tops. It was simply too huge to be hunted. Adult elephants today are safe from attack by wild animals for the same reason.

THE ATTACKERS

Smaller sauropods such as *Diplodocus* and *Camarasaurus* were still enormous. But they may have been attacked by giant meat-eaters. If so, they probably used their claws and tails in defence.

THUMBS UP

Diplodocus reared up to its full height and lunged out with its thumb spikes. *Camarasaurus* probably kicked out with its dagger-like hind foot to stab an attacker. A single lash from either dinosaur's tail was like being hit by a giant, flying telegraph pole.

***Allosaurus* (left) was no match for *Diplodocus* (right), when the giant sauropod reared up and showed its thumb spikes.**

A bushmaster snake of today (below) is hard to spot amongst the leaves. Maybe *Sellosaurus* (right) used camouflage too.

Like today's African elephant (below), the size of giant sauropods protected them from meat-eating predators.

HIDEAWAY

One of the best defences is to avoid being seen. Most hunters track their prey with their eyes. They may not see the animal if it blends into the background. Some modern creatures defend themselves by being the same colour as their background. A chameleon can change colour in seconds.

YOU CAN'T SEE ME

Hunters also use shape to identify their prey. Deer today have dark backs and light bellies so they are camouflaged against the vegetation. Dinosaurs probably had dark and light patches, spots or blotches too.

IT'S A FACT

EARLY WARNING

Anchisaurids like *Sellosaurus* were the ancestors of giant sauropods such as *Diplodocus* and *Camarasaurus*. They lived in Mid Triassic times and also had great, curved thumb claws to lash out with.

ARMOUR PLATING

Some plant-eaters relied on their tough skins to save them. Armoured dinosaurs such as *Euoplocephalus* were covered in thick plates of bone studded with spikes. *Euoplocephalus* even had bony eyelids which must have been like steel shutters.

ARMADILLO DEFENCE

When it was attacked, *Euoplocephalus* probably crouched down so it presented an armour-plated shell, just like a modern armadillo. An enemy could only attack it by turning it over. That would have been like flipping over a two tonne slab of rock!

IT'S A FACT

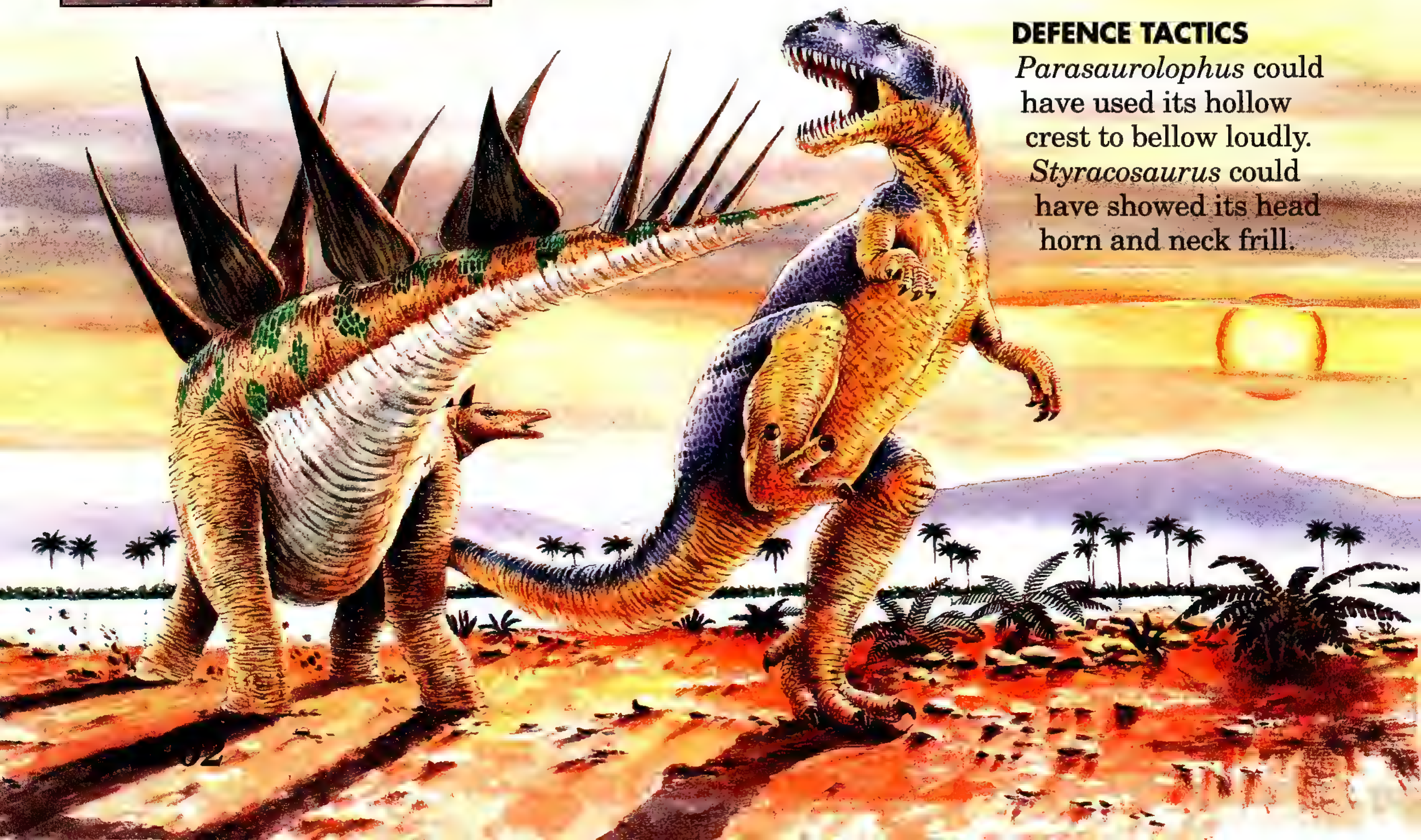
HANDLE WITH CARE

Peaceful plant-eating dinosaurs had some of the fiercest-looking horns. But these were mainly used to frighten the enemy. The long, delicate horns on the bony head frill of *Styracosaurus* would have been easily damaged in a serious fight.

A crocodile today (left) lashes its tail to defend itself. *Diracodon* (below) may have used its spikes against *Ceratosaurus*.

FRIGHTENING FEATURES

Many harmless creatures scare off attackers by looking very frightening. One type of modern chameleon inflates its body and hisses loudly through its brightly-coloured, open jaws. Crested dinosaurs may have puffed up parts of their bodies to look more threatening too.



DEFENCE TACTICS

Parasaurolophus could have used its hollow crest to bellow loudly. *Styracosaurus* could have showed its head horn and neck frill.

***Styracosaurus* (left) frightened with its frill in the same way as a bearded lizard today (below) uses its throat skin.**

QUICK GETAWAY

The only protection smaller dinosaurs had was to run away. *Hypsilophodon* and the other members of its family are known as 'dinosaur gazelles' because they could move so fast. The dinosaurs may have used defence tactics used by a Thompson's gazelle today when fleeing from speedy meat-eaters.

RUN FOR YOUR LIFE

A Thompson's gazelle can be caught by a cheetah but only if the cheetah is able to catch it in one quick sprint. Otherwise, the gazelle outruns the cheetah and the meat-eater gives up from exhaustion. To give itself a better chance of escape, a Thompson's gazelle will start running from a cheetah at just the right distance to tire it out.

SAFETY IN NUMBERS

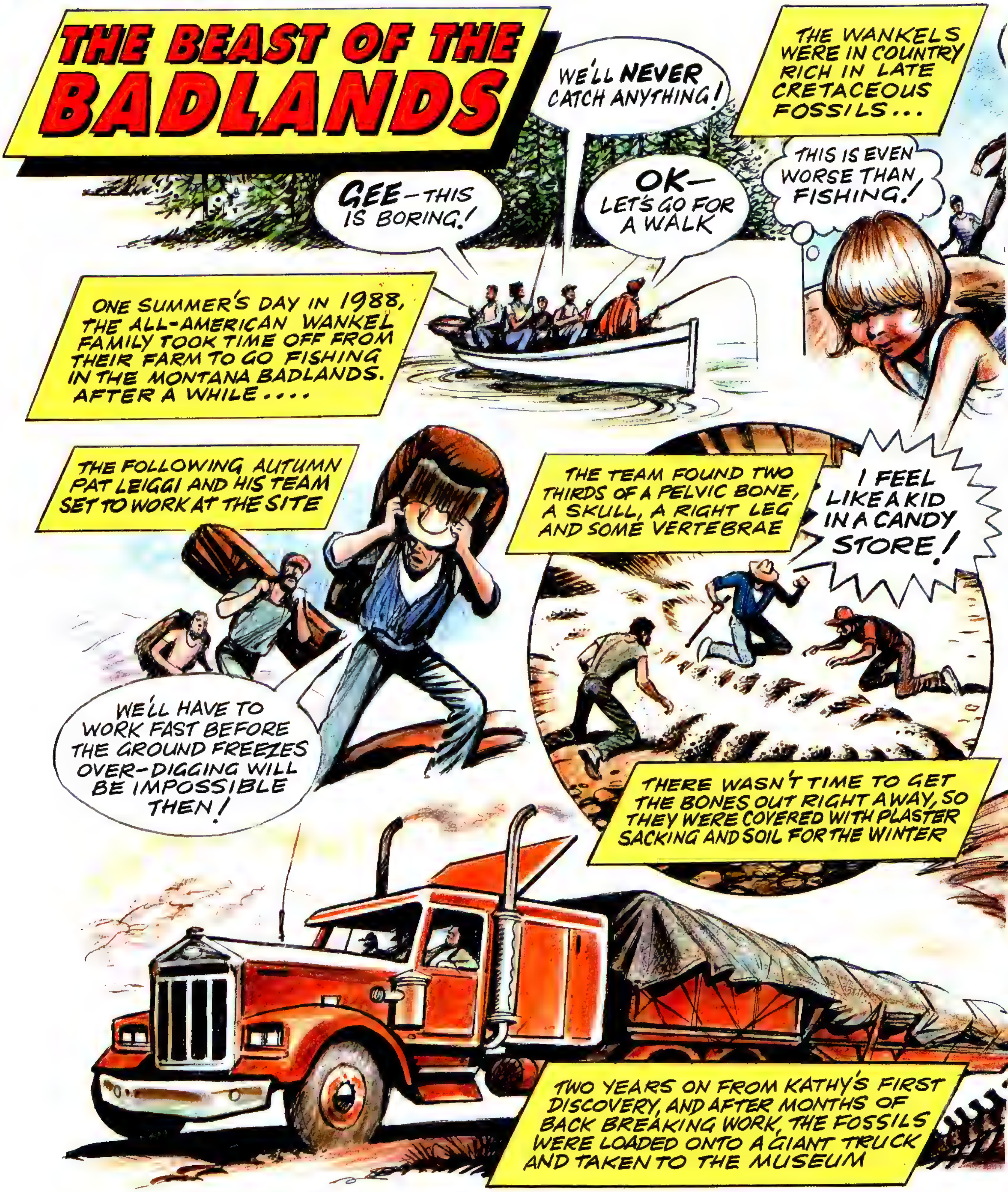
Many big plant-eating dinosaurs travelled in herds, with the adults surrounding their young. If the herd was ambushed, the adults became threatening. Horned dinosaurs might have formed a defensive ring facing outwards to scare attackers.

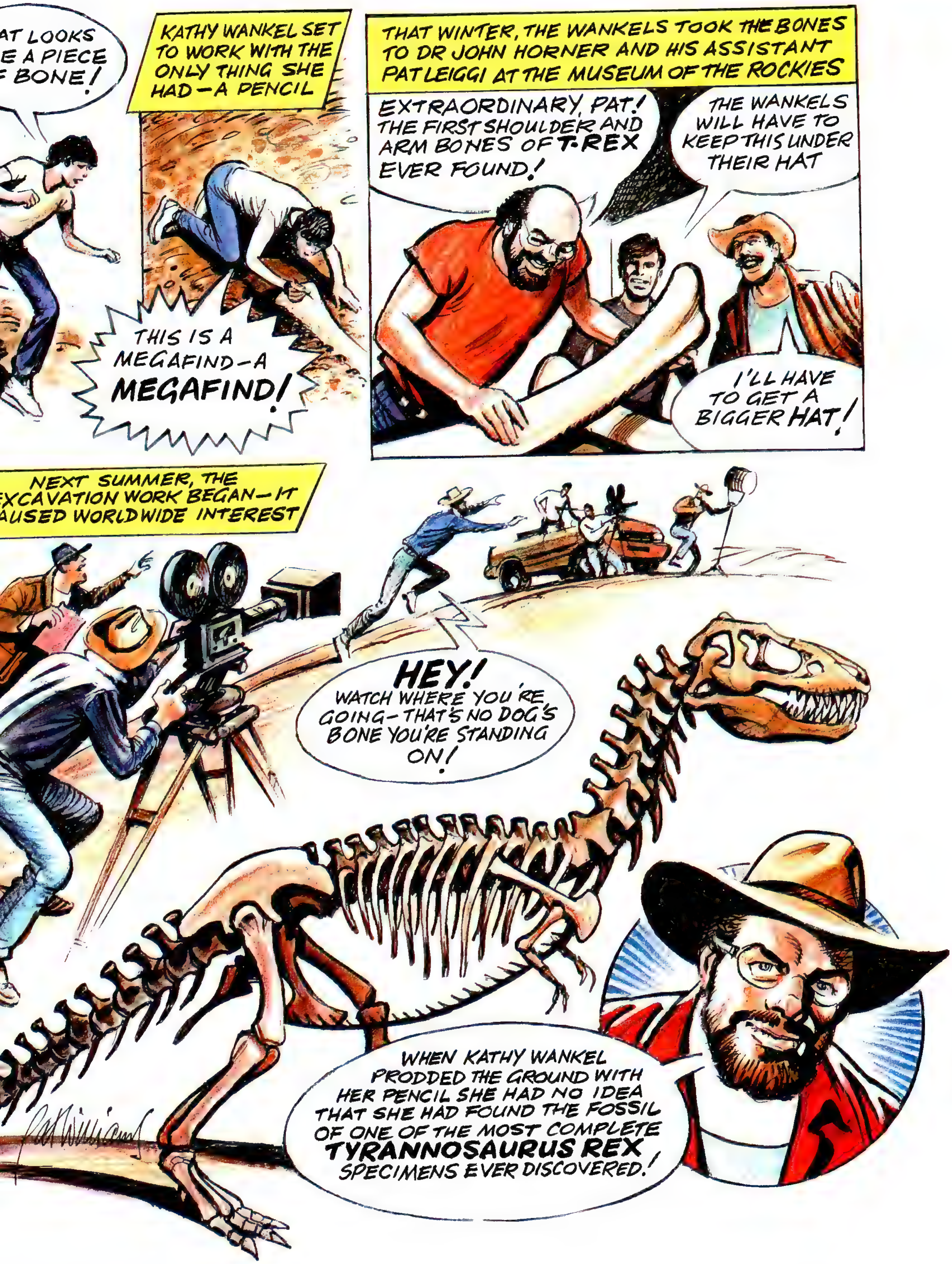
LAST STAND

The final defence of most creatures is to counter-attack with teeth, horns, claws or tail. A well-aimed blow from the bony tail club of plant-eating *Ankylosaurus* could have smashed the bones of its attacker.

Like a modern Thompson's gazelle (far left) *Dromiceiomimus* (left) could have outrun many predators.

THE BEAST OF THE BADLANDS


ONE SUMMER'S DAY IN 1988, THE ALL-AMERICAN WANKEL FAMILY TOOK TIME OFF FROM THEIR FARM TO GO FISHING IN THE MONTANA BADLANDS. AFTER A WHILE....
GEE—THIS IS BORING!
WE'LL NEVER CATCH ANYTHING!
OK— LET'S GO FOR A WALK
THE WANKELS WERE IN COUNTRY RICH IN LATE CRETACEOUS FOSSILS...
THIS IS EVEN WORSE THAN FISHING!
THE FOLLOWING AUTUMN PAT LEIGGI AND HIS TEAM SET TO WORK AT THE SITE
WE'LL HAVE TO WORK FAST BEFORE THE GROUND FREEZES OVER-DIGGING WILL BE IMPOSSIBLE THEN!
THE TEAM FOUND TWO THIRDS OF A PELVIC BONE, A SKULL, A RIGHT LEG AND SOME VERTEBRAE
I FEEL LIKE A KID IN A CANDY STORE!
THERE WASN'T TIME TO GET THE BONES OUT RIGHT AWAY, SO THEY WERE COVERED WITH PLASTER SACKING AND SOIL FOR THE WINTER
TWO YEARS ON FROM KATHY'S FIRST DISCOVERY, AND AFTER MONTHS OF BACK BREAKING WORK, THE FOSSILS WERE LOADED ONTO A GIANT TRUCK AND TAKEN TO THE MUSEUM


AT LOOKS
E A PIECE
F BONE!
KATHY WANKEL SET TO WORK WITH THE ONLY THING SHE HAD – A PENCIL
THIS IS A MEGAFIND – A MEGAFIND!
THAT WINTER, THE WANKELS TOOK THE BONES TO DR JOHN HORNER AND HIS ASSISTANT PAT LEIGGI AT THE MUSEUM OF THE ROCKIES
EXTRAORDINARY, PAT! THE FIRST SHOULDER AND ARM BONES OF T-REX EVER FOUND!
THE WANKELS WILL HAVE TO KEEP THIS UNDER THEIR HAT
I'LL HAVE TO GET A BIGGER HAT!
NEXT SUMMER, THE
EXCAVATION WORK BEGAN – IT
AUSED WORLDWIDE INTEREST
HEY! WATCH WHERE YOU'RE GOING – THAT'S NO DOG'S BONE YOU'RE STANDING ON!
WHEN KATHY WANKEL PRODDED THE GROUND WITH HER PENCIL SHE HAD NO IDEA THAT SHE HAD FOUND THE FOSSIL OF ONE OF THE MOST COMPLETE TYRANNOSAURUS REX SPECIMENS EVER DISCOVERED!
Pat Williams

Improve and test
your knowledge
with...

Dino Fact File

Follow the footprints to complete the quiz and
get to the bottom of the question!

1 Which dinosaur did Kathy Wankel find?
a) *Megalosaurus*
b) *T rex*
c) *Oviraptor*

2 *Gasosaurus* was named after:
a) the petroleum industry
b) a volcanic mountain
c) a city

Everyone's relative

What living thing is not an animal and not a plant? The answer - bacteria! Scientists believe that all living things are related to these microscopic organisms.

6 Which weapon did *Diplodocus* use to defend itself?
a) poisonous glands
b) heavy armour
c) thumb spikes

7 Which sea creatures are still alive today?
a) belemnites
b) ammonoids
c) molluscs

8 Which of these dinosaurs did not have cheeks?
a) *Triceratops*
b) *Allosaurus*
c) *Iguanodon*

Famous sites

What do the names Rattlesnake Canyon, Horseshoe Canyon and Bug Creek have in common? They are all famous dinosaur fossil sites in North America.

9 Which of these dinosaurs was a slow-mover?
a) *Dromiceiomimus*
b) *Brachiosaurus*
c) *Scutellosaurus*

Flying reptile

Tropeognathus was a large pterosaur that lived in the Cretaceous. From wingtip to wingtip it measured 6m, longer than two small cars. Its fossils have been found in Brazil, South America. Some local people believe that these monsters of the air still exist.

10 *Segisaurus* probably ate:
a) plants
b) insects and mammals
c) large dinosaurs

3 *Seismosaurus* digested its food with the help of:
a) digestive biscuits
b) lots of water
c) stomach stones

4 Duckbilled *Brachylophosaurus* was the size of:
a) an elephant
b) a horse
c) a bird

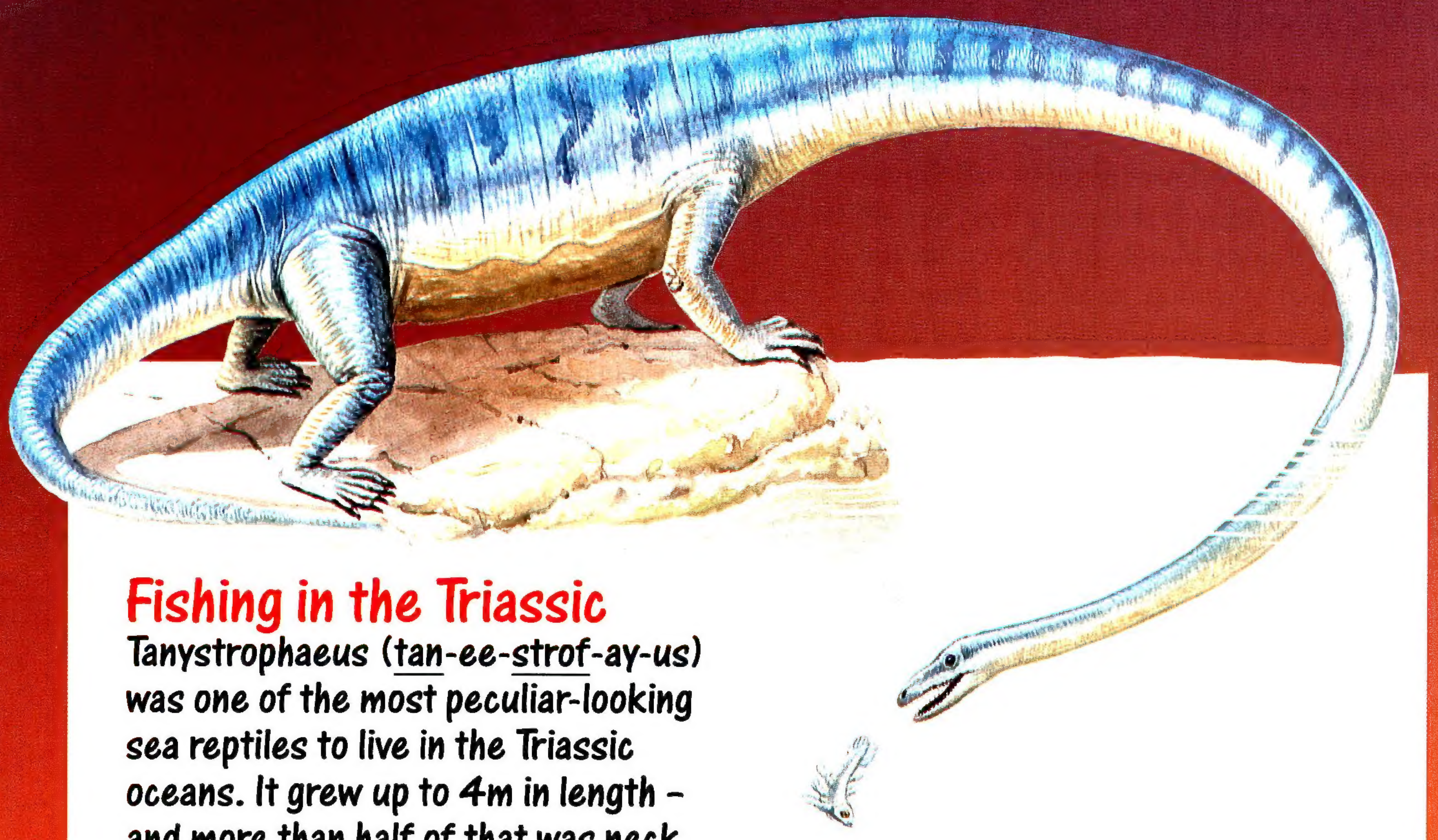
5 What did *Gasosaurus* use to kill its prey?
a) its sharp teeth and claws
b) its whip-like tail
c) its large horns

Important discovery

Gideon Mantell, the first person to show that giant reptiles existed, was excited when Iguanodon bones were found in south-east England in 1834. But there was a catch. The quarry owner demanded £25 for the slab of rock they were embedded in. Mantell's friends got together to raise the money. With these fossils, Mantell made many important new discoveries about dinosaurs.

Mystery footprints

The very first dinosaur footprints to be discovered were found in 1800 by a farm boy in Massachusetts, USA. At the time, no-one knew which three-toed animal could have made the prints – dinosaurs were not known about until years later.



Fishing in the Triassic

Tanystrophaeus (tan-ee-strof-ay-us) was one of the most peculiar-looking sea reptiles to live in the Triassic oceans. It grew up to 4m in length – and more than half of that was neck. Its incredibly long neck must have made a very useful fishing rod.

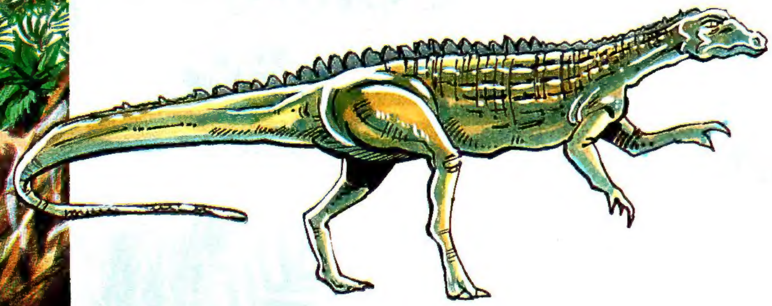
Answers to the questions on inside back cover

SAURORNITHOLESTES **80 MYA**

Fossils of *Saurornitholestes* (saw-roar-ni-tho-less-tees) were found in Alberta, Canada, in 1978. It was a predatory dinosaur with grasping hands and sharp claws. Although it was small and lightly-built, it could do great damage with its vicious, sickle-shaped toe-claw. Agile *Saurornitholestes* chased its fast-moving prey on two powerful legs, and attacked their flesh with little, saw-edged teeth. Its name means 'reptile-like bird robber'. *Saurornitholestes* lived in the Late Cretaceous Period in North America.

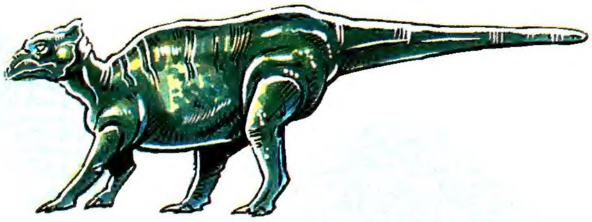
SCUTELLOSAURUS **195 MYA**

Scutellosaurus (skoot-el-oh-saw-rus) could defend itself from predators in two ways. It could run quite fast on two legs, or use its covering of bony plates for protection. Its crocodile-like armour gave *Scutellosaurus* its name, which means 'small-shield reptile'. When it wasn't escaping from predators, *Scutellosaurus* moved around more slowly on all fours, nipping off leaves and shoots with its beak-like mouth. On all fours, this dinosaur would only have come up to an adult human's knees. Long-tailed *Scutellosaurus* lived in Arizona, USA, in the Early Jurassic Period.



SECERNOSAURUS **80 MYA**

Secernosaurus (se-ser-no-saw-rus) was a duckbilled dinosaur, about the size of a small car. It lived in Argentina, South America. Its name means 'separate reptile', which comes from the fact that most of its relatives lived in northern parts of the world.

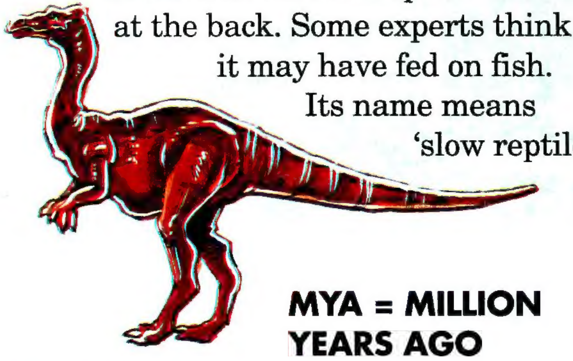


SEGISAURUS **185 MYA**

The headless skeleton of *Segisaurus* (seg-ih-saw-rus) was found in Arizona, USA, in 1933. It was named after Segi Canyon where it was discovered. *Segisaurus* was a tiny, two-legged dinosaur that probably fed on small mammals and insects. Its light frame and slender legs gave it great agility as a hunter.

SEGNOSAURUS **80 MYA**

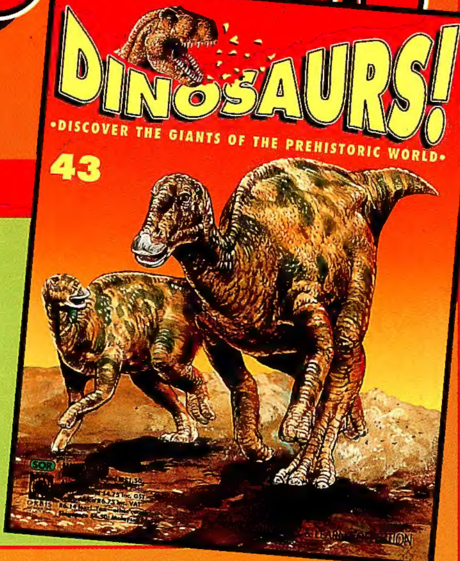
Segnosaurus (seg-no-saw-rus) was as long as an elephant, with a small head, bird-like hips and stout hind limbs. Its jaw was toothless at the front and had pointed teeth at the back. Some experts think it may have fed on fish. Its name means 'slow reptile'.



MYA = MILLION YEARS AGO

COMING IN PART 43 OF

DINOSAURS!

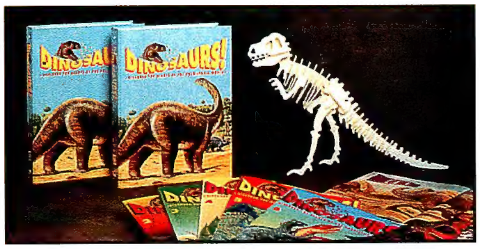


Did dinosaurs get ill? Find out in TIME DETECTIVE. Discover which reptile was the biggest animal ever to fly over the Earth in DINOSAUR WORLD.

PLUS

A day in the life of Oviraptor in HISTORY IN PICTURES
and
SPOTTER'S GUIDE
IDENTIKIT
GIANTS OF THE PAST
3-D GALLERY

DINOSAURS! binders



Keep your copies safe and neat with these fantastic binders.

Your binders have been designed to look good at home or at school. Each is sturdy and hardwearing – it even has a wipe-clean cover – and holds 13 issues. You'll want to use your DINOSAURS! collection again and again – for reference, for school projects, or just for fun. So don't let your copies go missing; keep them in your own set of binders.

DINOSAURS! binders are now available and cost just £4.95 (including £1 p&p). Please refer to the information on the inside front cover or telephone 0424 755755 for details.

THE DINOSAURS! POSTER COLLECTION

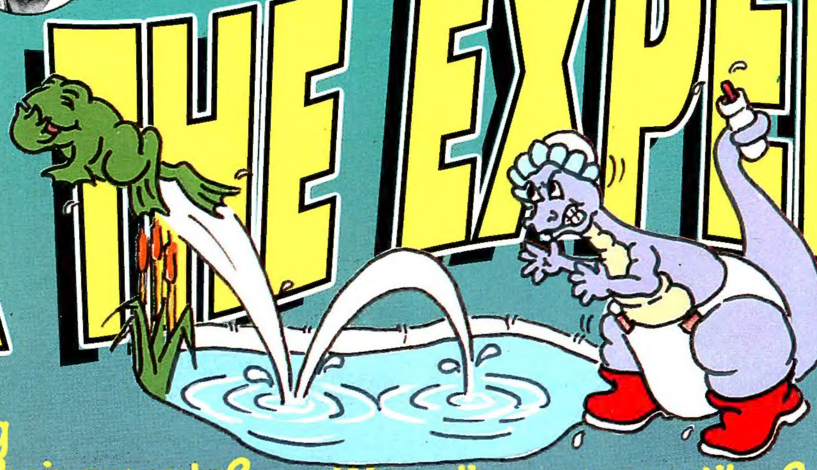
Have you ever wanted to fill your room with dinosaurs? Now you have your chance – with the *Dinosaurs!* POSTER COLLECTION. Each poster is 820 x 570mm (nearly eight times the size of this page) and features a superb dinosaur artwork. You'll find facts and figures about the dinosaur on the back – PLUS a look at some other prehistoric animals. The 12th poster is *Brachiosaurus*.

PICTURE CREDITS: front cover: Ryz Hajdul/Wildlife Art Agency. NASA 991 BR; Natural History Museum, London: IFC, 986 B; NHPA 990 BL, BR, 991 CR, BL, 992, 993, 998 R, 999, 1001, 1003 TR; Oxford Scientific Films 1003 BL; Planet Earth 987 B, 1002 TL; Science Photo Library/Manfred Kage 990 TL, TR; Science Photo Library/Eric Crane 991 T; Pat Williams 1004/5.
Artwork: Black Hat 1008; Robin Carter/WLAA 994/5; Mike Donnelly 1007; Edwina Goldstone/WLAA 998 L; Ryz Hajdul 985, 987 T; Tim Hayward 1000; Deidre McHale: back cover; Robin Morton 1003 TL, Nicholas Pike 988 B, 1002 B; James Robins 1001 TR, 1003 BR; Chris Turnbull/WLAA 989 R, 992/3; Steve White 996/7.

ANSWERS TO DINO FACT FILE QUESTIONS: 1.b 2.a 3.c 4.a 5.a 6.c 7.c 8.b 9.b 10.b

Dr. David Norman of Cambridge University answers your dinosaur questions

ASK THE EXPERT

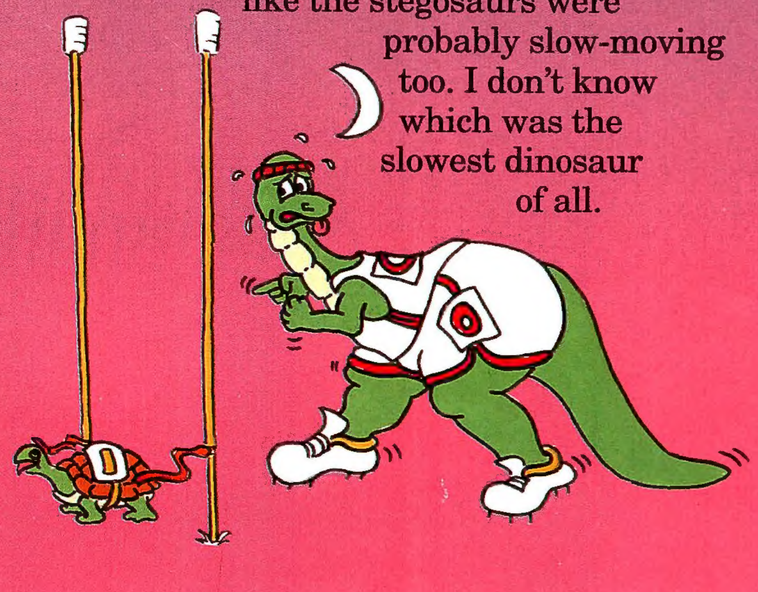


Did baby meat-eating dinosaurs hunt like their parents?

Baby meat-eaters probably did hunt in the same way as young crocodiles and alligators do today. The young dinosaurs would have practised hunting on smaller prey to start with – just as baby crocodiles feed on small fish and lizards, frogs and insects. As they grew, the young dinosaurs would gradually catch larger and larger prey. Whether baby meat-eaters were trained to kill by their parents, as lions and leopards are today, we cannot yet tell.

Which dinosaur was the slowest?

This is almost impossible to say from fossil evidence alone and it's too late to put the dinosaurs in a race! The giant sauropods such as *Brachiosaurus, Seismosaurus, Apatosaurus* and *Mamenchisaurus* would undoubtedly have moved slowly most of the time. But smaller dinosaurs like the stegosaurs were probably slow-moving too. I don't know which was the slowest dinosaur of all.

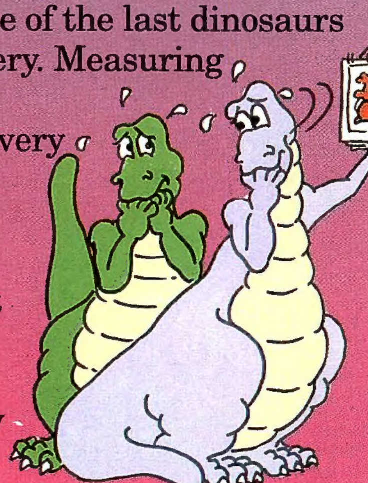


Were dinosaurs reptiles?

Yes. Reptiles are identified by their scaly skins, by the fact that they lay eggs with shells, and by the way their skeletons are made up. Dinosaurs had all these characteristics. However, whether they were exactly like today's reptiles is another matter. They have some features of mammals and birds. So, they were probably a rather special type of reptile.

Did all the dinosaurs die out on the same day?

Dinosaurs lived for over 160 million years. During that time thousands of species of dinosaur lived on Earth. Quite what happened at the time of the last dinosaurs is shrouded in mystery. Measuring the age of rocks is a difficult job and not very accurate. So experts now argue about whether the last dinosaurs all died at the same moment, or whether they died out more slowly over a period of hundreds, thousands, or hundreds of thousands of years.



42
9 771351 122017